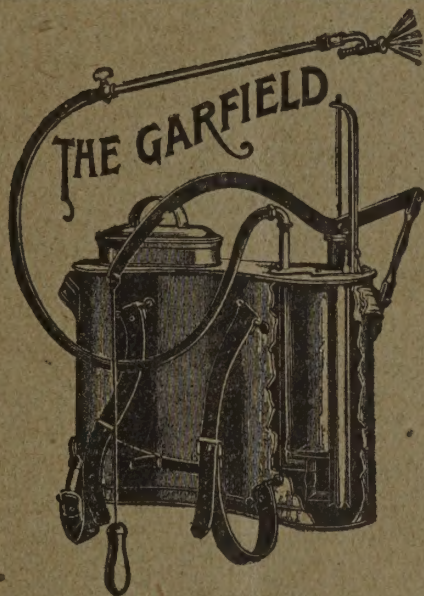


SPRAYING

PUMPS,

NOZZLES

AND MACHINES.



**FIELD
FORCE PUMP
COMPANY,**

LOCKPORT, N. Y.

U. S. A.

LOCKPORT, N. Y.

In presenting our new Catalogue to the public we simply desire to say that during the thirteen years in which we have been engaged in the manufacture of implements for the destruction of insect and fungus pests, we have earnestly tried to place in your hands only such outfits as you could conscientiously recommend to your friends. We believe that the liberal patronage with which we have been favored is ample proof that we have succeeded in our endeavor. We are constantly improving our pumps, and in every way seeking to supply a strong, cheap, practical machine. By the use of improved methods of manufacture we are able to keep always in the front rank in excellence of workmanship as well as in prices. We do not believe it necessary or business like to present our claims by the "beating of drums or blowing of horns." Or to insult the intelligence of the people, by unreasonable statements or impossible illustrations. We solicit your patronage and guarantee that every pump sent from our factory shall be just as we represent it, and if not so, it may be returned and money will be cheerfully refunded. We desire at this time to call your special attention to the fact that our Garfield Knapsack is now made with curved or rounded sides to fit the back, thus making it much easier to carry, and is an improvement which our customers will readily appreciate. We desire to express our cordial thanks for past liberal patronage, and shall hope by square and honorable dealing to merit a continuance of your favors.

Very truly yours,

H. S. CHAPMAN, }
C. A. BARNES. }

FIELD FORCE PUMP CO.

Illustrated Catalogue

- OF THE -

FIELD FORCE PUMP CO.'S

LATEST IMPROVED OUTFITS
For Spraying Trees and Vines by Hand and Horse Power

CONTAINING HINTS, SUGGESTIONS, RECIPES AND GENERAL INFORMATION
FOR THE PROTECTION OF FRUIT FROM THE RAVAGES
OF INSECT AND FUNGUS PESTS.

OF SPECIAL INTEREST TO FARMERS AND ORCHARDISTS,

ADDRESS:

Field Force Pump Company, Lockport, N. Y.



This illustration shows the usual method of mounting the outfit for general orchard spraying. Two or more extra barrels of water may be carried in the wagon to supply the pump. When the foliage on the trees is high above the ground, it will be found convenient to use a long hose and a long pole, to which the nozzle may be attached. By this means the spray can be guided to any part of the tallest trees.

SPRAYING IS NO LONGER AN EXPERIMENT BUT A SCIENCE!

THE SECRET OF SUCCESS

In the Fruit Orchard, Grape Vineyard, Hop Vineyard, Potato Field, Cotton Field, Tobacco Field
IS SPRAYING AT THE PROPER TIME.

Field • Force • Pump • Company,

LOCKPORT, N. Y.

AUTOMATIC AGITATORS FOR SPRAY PUMPS.

A volume might be written on this subject. A few words will explain their use and value.

Paris Green, London Purple or other arsenical poisons are not soluble in water, and being so much heavier, settle quickly to the bottom of the tank, and unless the spray pump is provided with an agitator, the work of spraying can be but imperfectly performed. In 1883 we conceived the idea of discharging a stream from the pump back into the tank for the purpose of agitation, and this plan was immediately adopted by other pump manufacturers, and is extensively recommended to this day. While the plan did not give entire satisfaction, it served the purpose very well until the use of Bordeaux Mixture became so generally adopted, then it was found that the lime used with the Bordeaux would settle and harden, and that a return stream discharged from the pump could not raise it from the bottom of the tank. Hence a more perfect and satisfactory means of agitation was necessary. This demand resulted in the invention of our Automatic Mechanical Agitator shown and described on the following pages, in connection with our Empire Queen (Fig. 62), and our Empire King (Fig. 63).

This invention is patented, and the patent owned by this Company. We charge nothing extra to our customers for the right to use this agitator, but no pumps except those made by this Company can be furnished with it; any others embracing this idea would be an infringement of our rights, and any persons using it liable for damages. Unscrupulous manufacturers may imitate this idea, and we warn all persons that the makers and users of our mechanical Agitator will be prosecuted in the courts.

The Spraying Pump is now regarded as a necessary adjunct to the farm equipment. Successful fruit or potato culture is impossible without it. Like other lines of trade the manufacturers have to meet competition, hundreds of cheap, imperfect and useless pumps are offered as spray pumps. But the wise purchaser will invest only in an implement that can be depended upon to do good, efficient, satisfactory service. The aim of this Company is to furnish first class, durable pumps, that are especially adapted for the work, that will last for many years, and at such low prices as good, first-class machines can be sold. Read our Catalogue carefully and favor us with your patronage, either direct or through your regular dealer, but be particular to insist that the outfit purchased is made by the

FIELD FORCE PUMP CO.

THE Empire Queen Spraying Pump.

WITH AUTOMATIC MECHANICAL AGITATOR.

This pump has a seamless brass cylinder, with solid brass plunger, brass valves without leather or rubber, and brass rod, also a brass screw spout to which hose is attached by a screw coupling. It has a large air chamber, by means of which the spray is strong and continuous. It is furnished with five feet of hose and our Graduating Nozzle. The Mechanical Agitator keeps the Poison and Water well mixed.

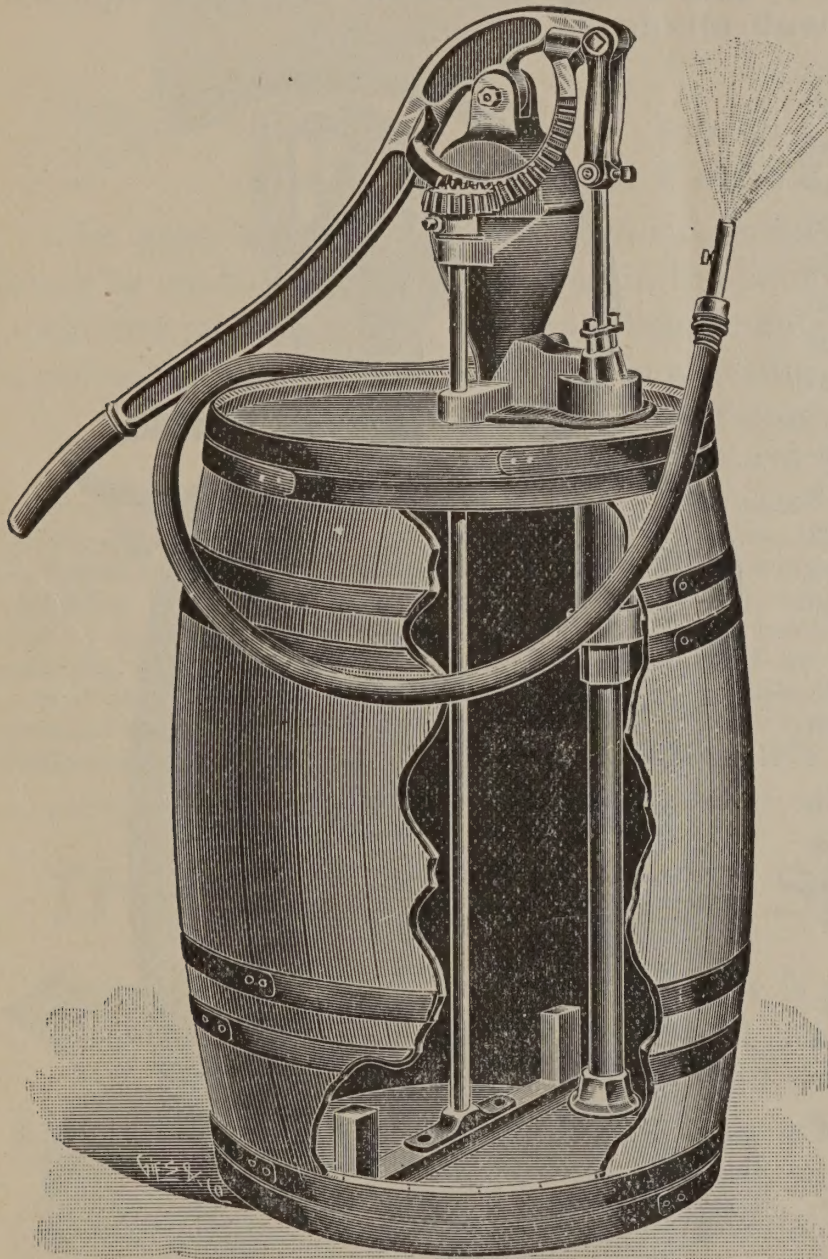


FIG 62.

Patented July 19th, 1892.

This Agitator works in connection with cogs from the lever, connecting with a companion gear at the upper end of a steel shaft; at the lower end of the shaft is a horizontal wooden bar. Thus when the lever is moved upward or downward the agitator bar travels in a semi-circle in bottom of cask and prevents the poison from settling.

This pump is furnished with suction pipe, and has also a fine brass strainer at bottom of suction pipe which effectually prevents leaves or dirt from getting into pump or nozzle.

This pump works easily and is guaranteed in every respect.

PRICE of outfit complete, without barrel, with brass cylinder, plunger and rod and spout, also with five feet of hose and spray nozzle.....\$ 9.00

Additional Hose at 10 cents per foot.

Weight complete, as above 45 lbs.

In mounting this pump on the barrel, be particular to bore the hole for the agitator rod exactly in center of head. This outfit is guaranteed as to strength, durability and efficiency.

SOUTH BARRE, N. Y., Nov. 26, 1894.

GENTLEMEN—The pump purchased last spring gave excellent satisfaction and the mechanical agitator worked perfectly. I was well paid for my time and investment. T. H. WOLFROM.

CAMDEN, May 8, 1894,

GENTLEMEN—The Mechanical Agitator on pump works perfectly and is entirely satisfactory.

E. H. BANCROFT.

OCEAN SPRINGS, Miss., April 25, 1894.

Pump is doing good work, and with the Mechanical Agitator it makes the most satisfactory outfit I have ever seen. F. S. EARLE, Supt. Branch Exp't Station.

FIELD FORCE PUMP CO., -- LOCKPORT, N. Y.

The Empire King Spraying Pump.

WITH AUTOMATIC MECHANICAL AGITATOR, WHICH ENSURES THE PERFECT MIXING OF THE POISON AND WATER.

You Cannot Scorch the Foliage with this Pump.

It has two Improved Spraying Nozzles, and sprays two rows of trees or vines at the same time. Has a seamless brass cylinder 8 inches long, with solid brass plunger and rod, brass valves without leather or rubber, and brass screw spout with stopcock. Has also two TEN foot sections of heavy hose furnished with couplings so it can be joined together making one continuous hose TWENTY feet in length. The Mechanical Agitator keeps the Water and Poison well Mixed.

This Agitator works in connection with cogs from the lever, connecting with a companion gear at the upper end of the steel shaft; at the lower end of the shaft is a horizontal wooden bar. Thus when the lever is moved upward or downward the agitator bar travels in a semi-circle in bottom of cask and prevents the poison from settling.

The pump is furnished with galvanized suction pipe, and has also a fine brass strainer at bottom of suction pipe which effectually prevents leaves or dirt from getting into the pump or nozzles.

This pump has a long lever, works easily and is guaranteed in every respect.

The air chamber is large which insures an even flow, and the stopcock on the spout is a valuable feature of this pump. Weight not including barrel, 55 pounds.

When not wanted for spraying, the agitator may be disconnected and this pump can be used for any purpose about the farm. It will pump acid, oil or water.

PRICE of outfit complete, without barrel, including brass working parts, double brass spout with stop-cock, two 10-foot sections of hose and two Spray Nozzles..... \$ 12.50

Additional hose at 10 cents per foot.

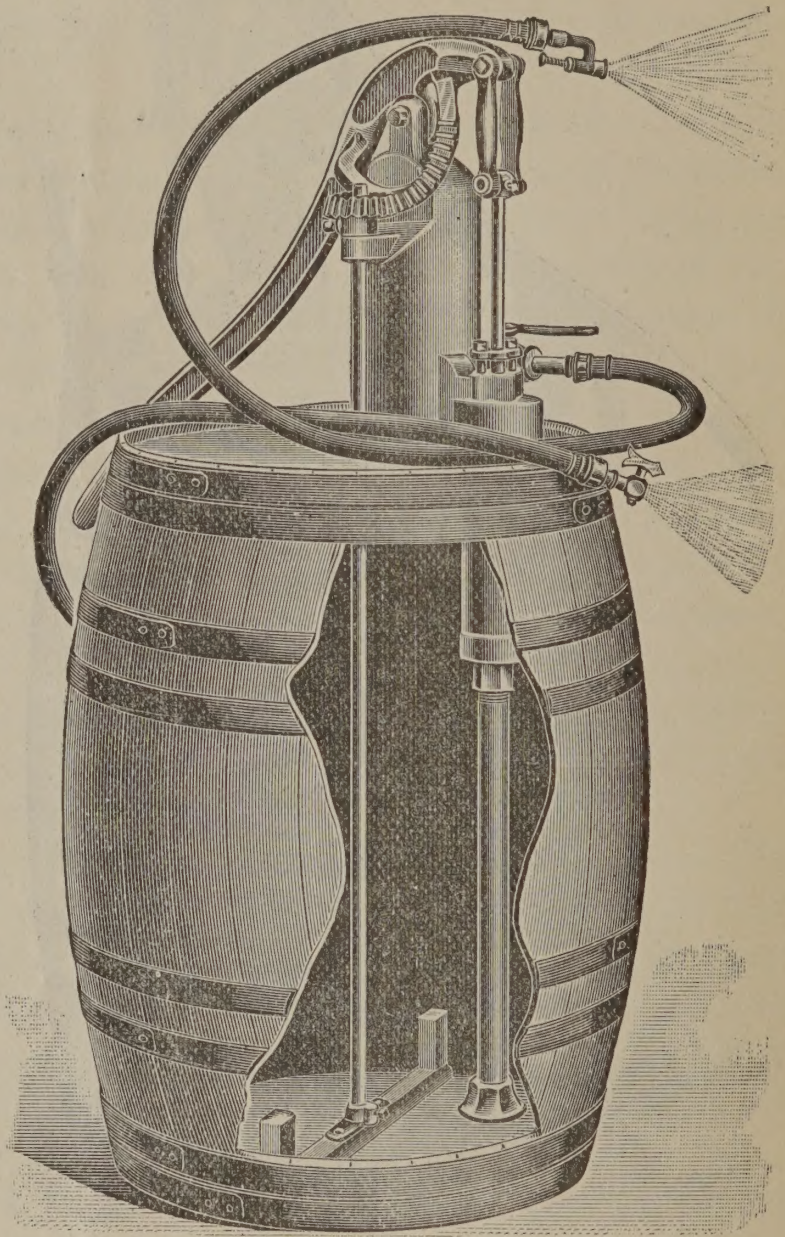


FIG. 63.

Patented July 19th, 1892.

We Furnish with this Pump One Eureka and One Vermorel Nozzle.
In mounting this pump on the barrel bore the hole for agitator rod exactly in center of the head.

MISSISSIPPI AGRICULTURAL COLLEGE, STARKVILLE, Miss., March 15, 1894.

GENTLEMEN—The Mechanical Agitator used with your spray pump is a most excellent invention and works in perfection. The shut-off in spout is also a very great convenience and effects a material saving in amount of liquid used. Very truly,

HOWARD EVARTS WEED,
Entomologist.

MORTON, ORLEANS COUNTY, N. Y., December 6, 1894.

GENTLEMEN—The Double Sprayer, with Mechanical Agitating Device, purchased from your agent, was used in my orchard with remarkable success. One man directed a spray to the top limbs, another to the lower limbs of same tree. The work was thoroughly and systematically performed, and the result was 600 barrels of No 1 fruit.

BENJAMINE MURPHY.

Tyrian Plant Sprinkler.

ESPECIALLY ADAPTED FOR SPRAYING FLOWERS AND PLANTS IN HOUSE OR CONSERVATORY.

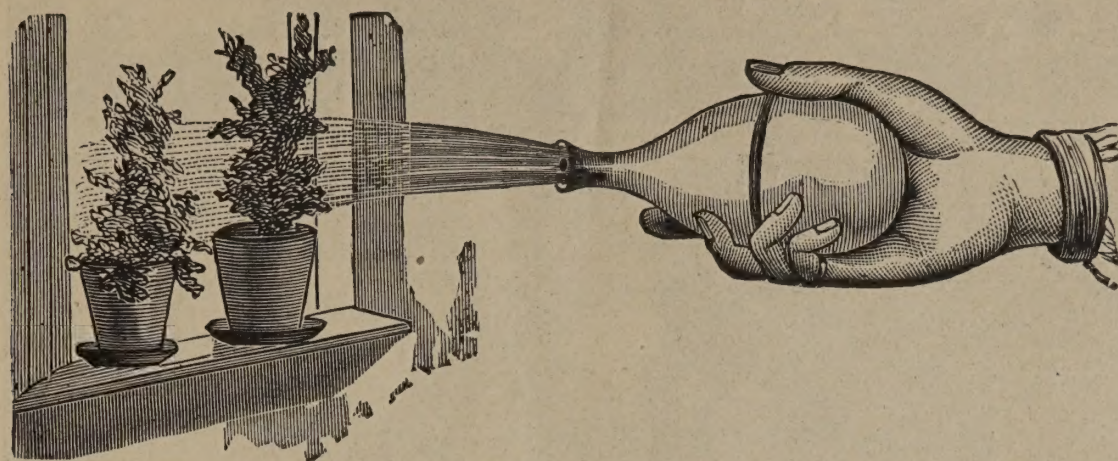


FIG. 70.

MAKES A SPRAY JUST LIKE RAIN.

The spray fixture is made of hard rubber and can not easily get out of order. It can be used for sprinkling clothes in the laundry, spraying carpets and clothing to kill and prevent moths, spraying disinfectants and deodorizing the sick room. Superior in every way to the dipper or watering pot.

PRICE, 10 Ounce Capacity, \$1.00.

By mail, postage paid, or packed with other goods.

Prof. Bailey, of Cornell, has well said: Our motto hereafter must be spray, *spray*, SPRAY. The Pacific Coast fruit growers are doing an immense amount of work in this direction. If they are forced to do it, in a comparatively new fruit-growing territory, why should not the New York orchardist in a territory almost a century under cultivation? We shall soon, no doubt, be called upon to fight other insect pests besides those we now have. There is one in California known as scale that is working eastward. No doubt it will find its way here, either through the medium of nursery stock or fruit, and we will be called upon to fight it. Let us be prepared. I recommend constant watchfulness, continual spraying and a better system of cultivation of our orchards.—*The Cultivator and Country Gentleman*, November 15th, 1894.

THE EUREKA SPRAY NOZZLE.

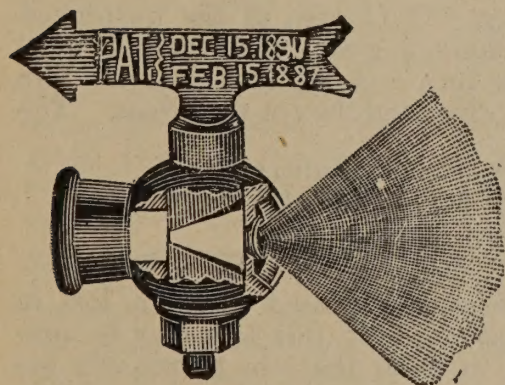


FIG. 65.

This nozzle is regulated by the spigot, and will throw a solid stream or a spray of any degree of fineness. Will throw a fine spray to a greater distance than any other nozzle on the market. Is also adapted for use with the Bordeaux mixture, or for *whitewashing* trees or henhouses. If clogged, is easily cleaned by simply turning spigot. We guarantee it as a first-class nozzle.

PRICE, 3-4 inch, \$1.00.

Sent by mail, postage paid, on receipt of above price.

Spraying Poultry Houses.—A knapsack spray pump should be owned by every poultry keeper. There is nothing equal to it for spraying the poultry house with dilute carbolic acid as a disinfectant and deodorizer, or with kerosene emulsion for lice. By using an automatic nozzle, and making a thin whitewash with lime and straining it carefully, the labor of whitewashing is greatly lessened.—*American Agriculturist*, November 10th, 1894.



SPRAYED. **NOT SPRAYED.**
From photographs of **EXPERIMENT STATION POTATO FIELD**, made Sept. 10, 1892, showing results of three applications of Bordeaux mixture.

SUMMARY OF SPRAYING EXPERIMENTS, 1892.

A comparative test was made in 1892 of twelve different fungicides to determine their relative merits in checking the late blight of potatoes. The work was duplicated upon different soils and with several varieties of potatoes. All the plants were late enough to escape the early blight and remained healthy and vigorous until the warm, rainy weather of the middle of August. The late blight then began to spread rapidly on all the unsprayed plots. Each of the fungicides tested was of some value, but none of them equalled the Bordeaux mixture. The most worthless of the twelve was the solution of copper carbonate in ammonia, generally known as "Ammoniacal Copper Carbonate." We mention this especially since we have frequently seen it recommended in the agriculturial press for use upon potatoes, and have had letters of inquiry from Vermont farmers concerning it. We have tested it carefully for three years with uniformly unsatisfactory results.

A similar but stronger compound known as "Modified Eau Celeste" gave pretty good results. This solution will be spoken of again later in this bulletin

The benefit from the use of the Bordeaux mixture was striking. The leaves of the unsprayed plants were dead by the middle of August, while those sprayed remained green and vigorous until the last of September. The appearance of the field on September 10th is shown in Figure 4. The increase in yield from this prolonged life of the vines and from checking the rot was great. The yields from the plots shown in the engraving were:

	Sound Marketable tubers per acre.	Rotten tubers of marketable size.
Plots sprayed with Bordeaux mixture.....	324 bu.	3 bu.
Adjoining plots not sprayed	100 "	23 "
<i>Apparent gain from use of Bordeaux Mixture, 224 bu. per acre.</i>		L. R. JONES, Botanist.

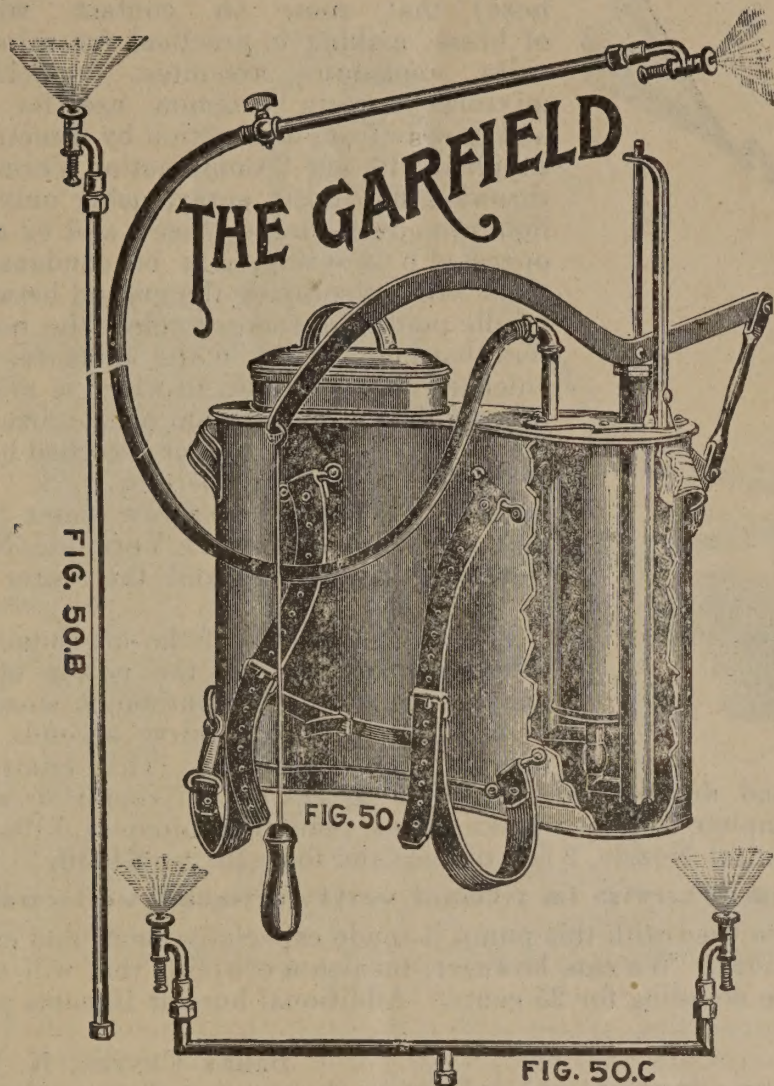
Prof. B. T. Galloway, of Washington, D. C., says: The diseases discussed cause a loss in this country of several million dollars annually. It is believed that much of this loss may be prevented by following the suggestions made, but it must be borne in mind that the treatments are preventive, not curative. The importance, therefore, of beginning the work in time can not be too strongly urged. In the case of blight and the *Marcrosporium* disease the question may arise as to the advisability of going to the expense of arranging for work that may not be necessary on account of the diseases not appearing. In answer to such a question it may be said that there is scarcely a section of the country where one or another of the diseases mentioned does not occur every year. Furthermore, it is a fact well established by experiments that, even if no diseases whatever appear, spraying with the Bordeaux mixture will increase the yield to such an extent as to make work profitable.

The nozzle found best suited to the work is the *Vermorel*.

THE GARFIELD KNAPSACK SPRAYER,

FOR VINEYARDS, NURSERIES, AND POTATO FIELDS.

CONCAVED TO FIT THE BACK.



This machine consists of a copper tank holding five gallons. The pump is made entirely of brass and copper, and cannot corrode or rust. There is a large air chamber placed inside the tank for convenience, which has sufficient capacity to keep up the pressure and continue to discharge the spray for nearly one minute after the operator stops pumping. By removing five brass screws on top of tank the pump can be lifted out. The lower valve is screwed to bottom of cylinder, hence no trouble or expense to reach the valves. The tank having rounded ends is stronger and less liable to leak; it has handles for lifting, thus adding greatly to the convenience of "loading" upon the back. There is a large opening on top for the reception of liquid, with a fine strainer set inside. A brass pipe 15 inches long with a stop cock is furnished with each machine. The Nozzle is our combination Vermorel so highly recommended and gives universal satisfaction. The Vermorel attachment throws a fine misty vapor spray, but on account of its fineness cannot be thrown more than fifteen feet. More force applied only serves to make the spray finer, but by means of the combination the Vermorel attachment can be unscrewed leaving a solid stream nozzle, which will throw to a distance of 30 to 50 feet. We also show in this engraving two special fittings, Fig. 50, B. and C., the former for carrying the spray to the tops of tall vines or up into orchard trees, the latter a cross section brass pipe for attaching two nozzles for spraying two rows of potatoes, cotton or tobacco. These special fittings are not included in price of the outfit. Weight, empty, 14 lbs.; full, 60 lbs.

The Pump has no stuffing box and is furnished throughout with Brass plungers and valves.

PRICE, \$10.50.—With Automatic Agitator, \$12.00.

which includes everything shown except special fittings Fig. 50 B and 50 C. These will be supplied as follows: Fig. 50 B—5 feet sections, 50 cents. Fig. 50 C—3 ft. long with couplings, (no Nozzles) \$1.00. Additional hose at 10 cts. per foot.

THE "LITTLE GEM" SPRAYING PUMP

It Discharges a Stream in the Pail and Keeps the Poison Stirred Up.



FIG. 53.

very compact, strong and durable, nothing liable to get out of repair or wear out. The entire weight of the pump complete is 4 lbs; when boxed ready for shipment, 7 lbs.

Price, including Vermorel Nozzle, 2 feet of hose and foot stirrup, **\$4.00.**

This Pump is fitted with metal valves.

The Vermorel nozzle used with this pump is made especially for it, and cannot be used with other fittings or connections. We can, however, furnish a coupling that will attach this nozzle to any standard $\frac{3}{4}$ -inch hose coupling for 25 cents. Additional hose at 10 cents per foot.

BARRE CENTER, N. Y., Nov. 17, 1894.

GENTLEMEN—The pump works nicely and throws the spray to the top of my tallest trees without difficulty.

IRA M. HANDFORD.

Do even more than you claim for them. Fruit first-class. Am satisfied spraying has come to stay.

W. D. MILNE.

MONROE Co, Dec. 6th, 1894.

I can heartily recommend your pumps, and am more than pleased with the results. Had 400 barrels of choice fruit, which sold for \$1.75 per barrel.

C. F. BUSH.

MORTON, N. Y., Dec. 7th, 1894.

ORIGIN OF THE BORDEAUX MIXTURE.

The origin of the famous Bordeaux mixture is quite singular. It was as follows: Years ago an old Frenchman near Bordeaux, France, began spraying his orchards with the solution, for the purpose, he said, of stopping the depredations of passers-by. The trees were left with a most uninviting, dirty-green coat. The neighbors noticed that while the solution was in use the trees bore better fruit and more of it. This led to an investigation of causes and the discussion of the utility of germicide sprays that has led to a widespread knowledge of different species of destructive parasites. The Bordeaux mixture still remains a standard preparation after years of test.

Here is an instance of the benefit of spraying this mixture: A large peach orchard was affected with a fungus which was destroying the foliage. The owner concluded to make a test of the value of a fungicide solution; he sprayed one-half the trees with the Bordeaux mixture. When he harvested his crop the sprayed portion of the orchard netted him \$200 an acre, while the balance netted but \$20 an acre.

The formula for the mixture is as follows: Four pounds sulphate of copper 4 pounds lime, 50 gallons water. At one time a larger quantity of sulphate of copper was used, but it was found that the smaller amount answers the purpose fully as well.—*Indiana Farmer*, September 23, 1893.

The Truck and Barrel Sprayer.



FIG. 75.

This machine consists of our Empire Queen outfit, Fig. 62 complete, and mounted on a barrel having a capacity of 52 gallons, together with the barrel cart. The cart has strong wheels, 34 inches in diameter, and 37 inches from outside to outside of hubs; it has strong hardwood handles, and is a very convenient machine for use in small orchards or gardens, where it is impractical to drive a horse.

Price complete, including everything shown in the engraving, with 10 feet of hose and a graduating nozzle:

Pump with Brass Cylinder, Plunger and Rod, - - \$19.00

PRICES OF INSECTICIDES.

We have arranged to supply our patrons with a superior quality of Insecticides at the following LOW PRICES:

London Purple, in bulk	14c.
Paris Green, in bulk.....	25c.
Whale Oil Soap, in bulk.....	8c.
Sulphate of Copper, in bulk.....	6c.

LOCKPORT, N. Y., November 2, 1894.

To All Concerned:—The undersigned are personally acquainted with the Field Force Pump Co., who have been in business in this city since 1882. We know them to be an honorable firm and entitled to the confidence and patronage of the public.

Signed, JAMES ATWATER, Mayor.
JOHN A. MERRITT, Postmaster.
H. C. CUMMINGS, Agent Am. Express Co.

HOW TO SEND MONEY.

Remittances can be made *with perfect safety* by *Express Money Orders*, which can be obtained at any office of the American; Wells, Fargo & Co., or United States Express Co. When these companies have no office, remit by Bank Draft on New York, Postoffice Order on Lockport, N. Y., or Registered Letters payable to us. Goods sent C. O. D. only when one-fourth of the amount is sent with the order; this is simply to guarantee good faith and payment of Express charges.

FIELD FORCE PUMP CO., LOCKPORT, N. Y.

The New Victor Spraying Machine,

FOR 1895.

OPERATED BY HORSE POWER, WITH AUTOMATIC
MECHANICAL AGITATOR.

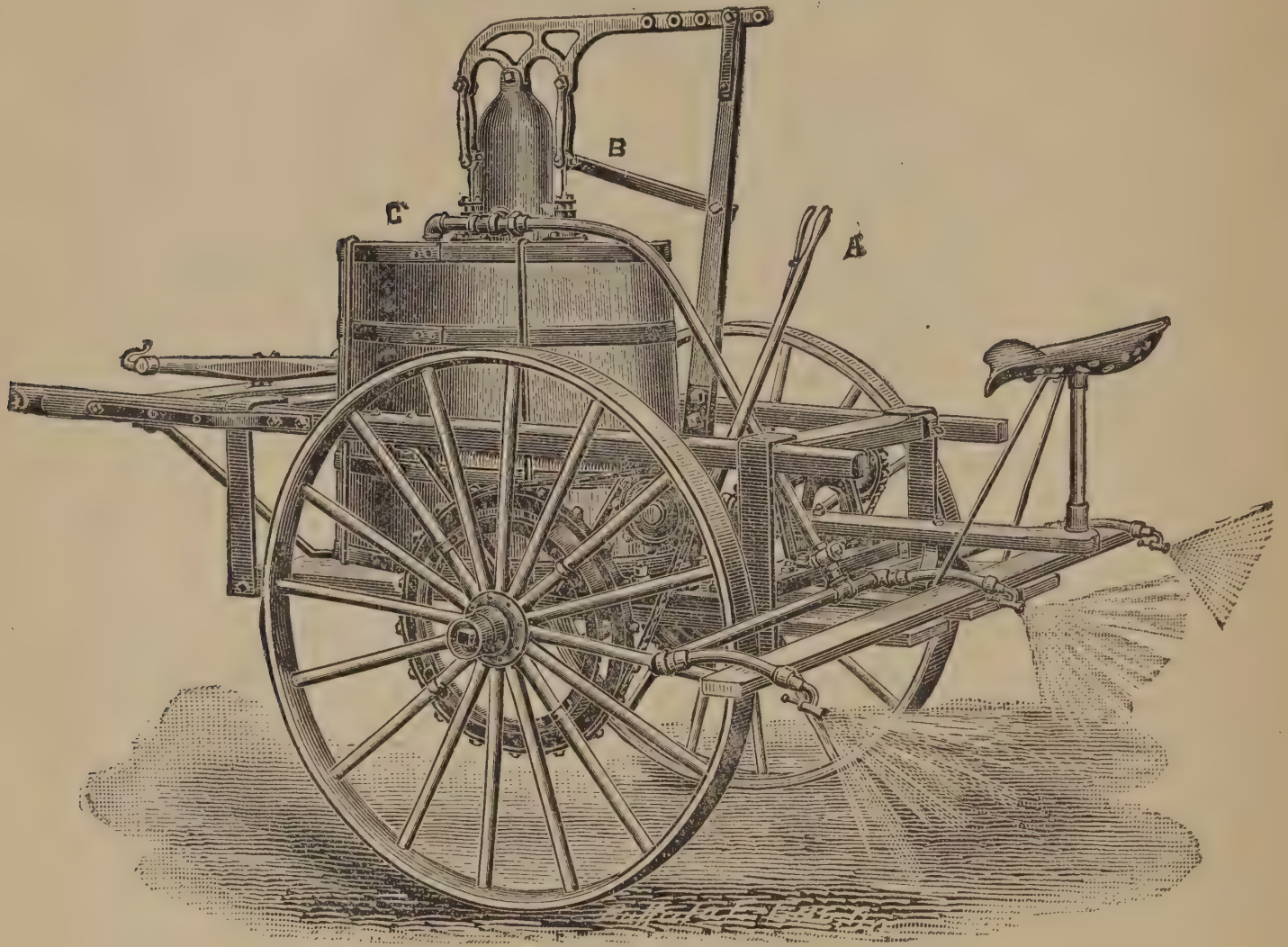


FIG. 51.

This machine for 1895 consists of a two-wheel cart, with a strongly-braced frame, the wheels are three and one-half feet in diameter, with tires three inches wide, the tread between the wheels is three feet. It has an oak tank holding 70 gallons. The agitator for mixing the poison and water consists of a horizontal wooden bar which travels in a semi-circle in bottom of tank, and is worked automatically in connection with the pump by the shaft "B". This works on same principle as those shown in Figs. 62 and 63. The pump is a double cylinder brass pump with brass working parts. The machine is geared at both wheels with endless sprocket chain gears, and has a double crank near center of shaft which operates the pump and mixer. There is also a hand lever for operating the pump by hand when not in motion, which can be attached instantly. The arrangement for throwing out of gear is convenient and easily controlled by the driver. (See lever "A".) The pipes and nozzles shown here are arranged for spraying potatoes. Pipes and nozzles for spraying grape vineyards can be furnished when ordered. When piped for vineyards four Vermorel Nozzles are sent, two on each side of the machine, one above the other. By this means one row of grapes on either side of the machine can be sprayed at the same time, and by placing one nozzle twenty inches above the other, the higher and lower foliage on

the vines are sprayed at the same time, and by means of the double elbows and fittings, which we furnish, the nozzles can be set at any angle desired. Two brass stop cocks are furnished so the spray may be shut off on one side of the machine while it is in use on the other side. The pump is furnished with a back pressure safety spout (marked "C") which will prevent unnecessary strain on the pipes, nozzles or machinery. When desired for spraying potatoes it will be furnished with a pole for two horses, as the wheels must straddle one row and the horses can walk between the rows.

- PRICE,** piped for Vineyard Spraying, with thills for one horse, with four Vermorel Nozzles,.....

\$ 65.00.
- PRICE,** piped for Spraying Potatoes, with pole for two horses, with three Vermorel Nozzles,.....

\$ 70.00.
- (Price does not include Double Whiffletrees or Neckyoke.)

When orchards are to be sprayed, we will furnish two 10-foot sections of hose and two Vermorel Nozzles in place of stationery pipes and nozzles at prices named above. If the hose is wanted in addition to the pipes, add \$3.00 to above prices. In ordering please state definitely what work the machine is to do. In offering our "New Victor" to the public we do so with the positive assurance that it has been thoroughly tested and will not fail to give the best satisfaction.

ENDORSEMENTS AND TESTIMONIALS.



FIG. 49. A FRUIT ORCHARD AFTER SPRAYING.

(The Rural New Yorker)

The R. N. Y. the past spring for the first time tried the effect of spraying an apple tree with water and Paris Green. The tree (Newtown Pippin) is about 14 years old from the nursery, and has borne for four seasons without maturing a single apple, so far as I know, that was not injured by the codling moth. It was first sprayed when the apples began to set, and the tree was not entirely out of bloom. It was again sprayed four days after and again when the apples bent from an upright to a downward position. It bore a moderate crop, and, though every apple was examined, there was not a trace of a codling moth. The quantity of Paris Green used was a level teaspoonful to two gallons of water. It was sprayed on every part of the tree, underneath and over the leaves, through a Vermorel Nozzle. The experiment was conducted in a small way, certainly, but it proved what the R. N. Y. desired to prove for itself, that thoroughly spraying apple trees will insure the destruction of the codling moth without the slightest apparent injury to the foliage.

Field Force Pump Company:

DEAR SIRS—An old orchard of considerable size, once productive and profitable, became so infested with caterpillars that I feared I would lose it. Year after year it was as completely stripped as though fire had gone through it. It ceased almost entirely to produce fruit. One year it did not produce an apple; another year only three barrels. At this stage of affairs your Sprayer, the "Perfection," was brought to my notice, with some misgivings as to the result, I purchased an outfit, and began spraying. Although myriads of caterpillars were out and others fast hatching, yet not a tree was stripped or showed signs of injury. I only sprayed three times to completely clear my orchard. The caterpillars would, after eating bunch up as usual. and at first thought that none were being destroyed; but I soon found they never spread out again after their first feed of poison, as they died on the limbs where they clustered. As a result the orchard took a new lease of life. It produced no fruit that season, no fruit buds, owing to its defoliated condition from the previous year; but made vigorous growth, and this year gave me 200 barrels of choice fruit, one of the largest crops it ever produced.

The whole outlay for Sprayer and expense of applying the poison did not exceed \$20.00. I have saved my orchard, and my Sprayer will do good work for many years to come in its further protection and in the destruction of potato beetles.

BROOKLYN, Annapolis Co., N. Scotia, December.

Yours truly,

ERNEST NEILY.

THE IMPROVED COMBINATION VERMOREL SPRAY NOZZLE

Will throw a Solid Stream or the Finest Misty Spray.

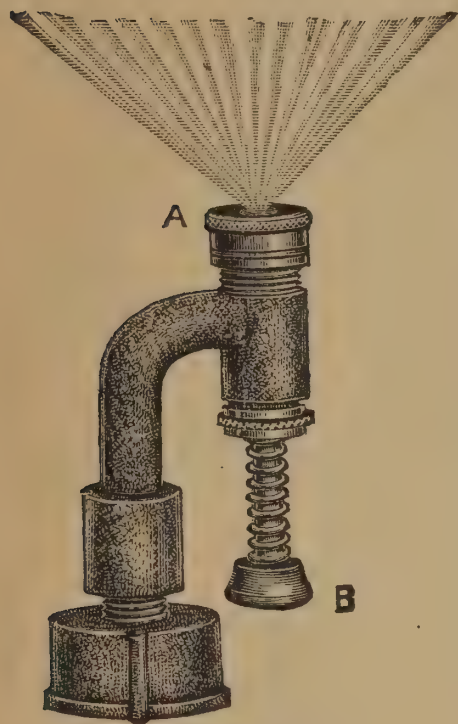


FIG. 60.

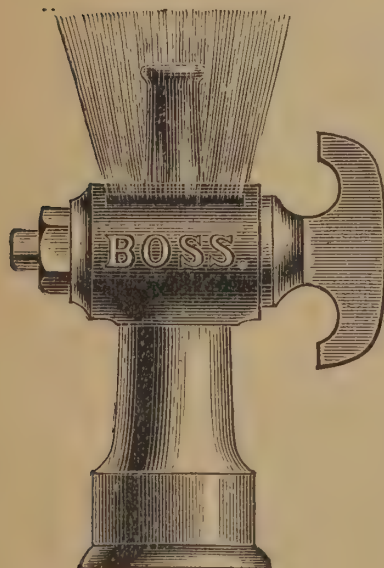
This Nozzle is the Vermorel, with several very important improvements. The spindle is provided with a spring, which keeps the needle point from passing into the aperture A, except when the thumb is pressed upon the broadhead B, which is done for the purpose of freeing the hole of any obstruction. This small spindle also divides and spreads the liquid to use it with the greatest economy, and at the same time produces the finest vapor spray. It will require less than one-half the liquid to cover a given surface that will be needed with any other nozzle. It is especially adapted for use in vineyards, nurseries, etc., etc. The extreme fineness of the spray produced makes it impossible to throw it more than 15 feet. More force applied only serves to make the spray finer, but throws no farther; but by the combination the Vermorel attachment can be unscrewed, leaving a solid stream nozzle which will throw to a distance of 40 or 50 feet.

Price, $\frac{3}{4}$ inch with two Caps A, having different size holes, 75 cts.

Sent by mail, postage paid, on receipt of the above price.

THE "BOSS" SPRAY HOSE PIPE.

FIG. 6.



We still offer this pipe, which for ten years has held the position among pipes that its name signifies. Its merits are too well known to need more than brief mention.

It throws a perfect stream or a heavy spray.

It delivers more water by spray than by solid stream.

The spray comes directly through the pipes, thus avoiding strain on the hose.

It has no packing nut to work loose or leak. It is made in the best possible manner and warranted.

Every pipe sent out is plated.

PRICE: $\frac{3}{4}$ inch75 cts. each.

THE "GRADUATING" SPRAY NOZZLE.

FIG. 42.



It will throw a coarse or a fine spray, a large or small solid stream. The spray can be closely contracted or made to cover a large area.

These results are obtained by revolving it part way round.

Simple in design, having no cocks, cans or valves.

This nozzle attached to a Standard, makes a beautiful fountain. A splendid nozzle for general use for spraying trees, and a general favorite with the fruit growers.

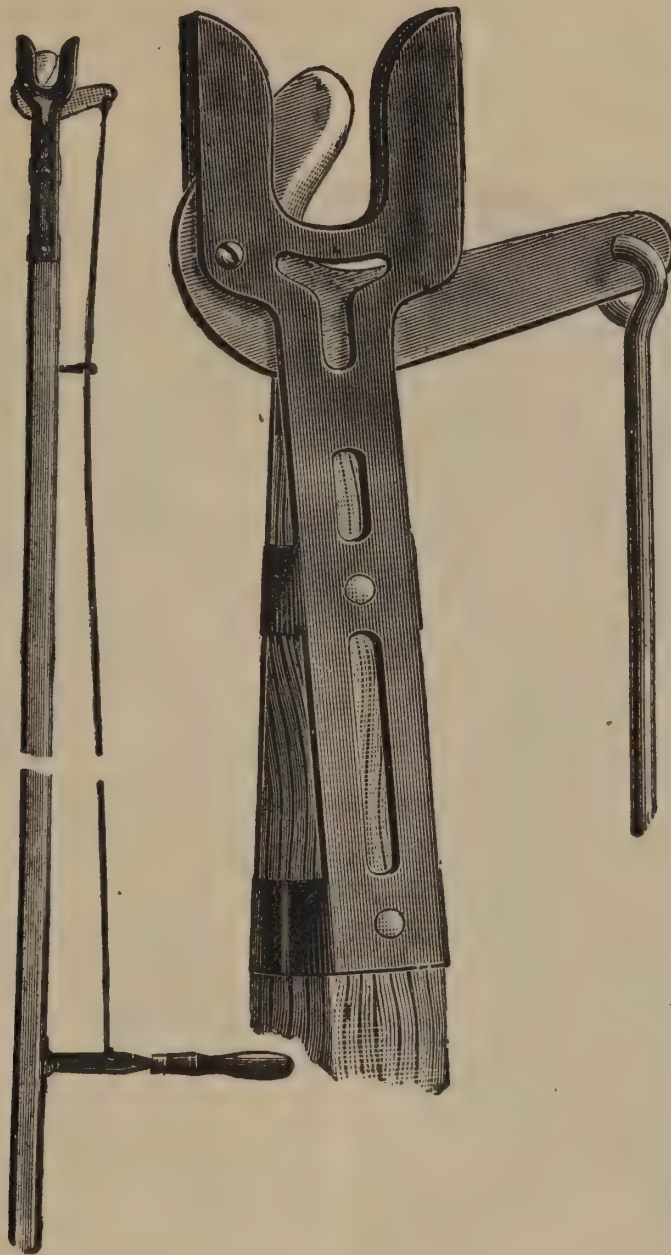
PRICE: $\frac{3}{4}$ inch.....75 cts

MILLER'S CORNERS, N. Y.

Gentlemen:—The New Victor Potato Sprayer works very nicely, I can spray five rows without difficulty, and the force throws the water through the vines thoroughly.

C. R. WHITE.

HENRY'S NEW TREE PRUNER.



By referring to the illustration, it will instantly be seen that this Pruner commences the cut at the **UPPER PART** of the limb, instead of the **UNDER PART**. This **FACT ALONE** is sufficient to convince all of its great superiority, but the immense advantage thus obtained can only be **FULLY** appreciated by personal trial. Observe the simplicity of its construction, its enormous power and the ease with which the branch to be cut is approached. You have only to push the instrument to the limb, and the forked frame instantly guides itself to the cutting position.

[illegible]

Extra Blades, 25 cents each.

Your orders are respectfully solicited.

The best tree pruner I ever used.

H. SANFORD, Wayne County, N. Y.

Cuts perfectly and gives entire satisfaction.

FRANK COTHRAN, Oakland County, Michigan.

Have used several tree pruners, but this leads them all.

JAMES B. MARKLEY, Middlesex County, Ont.

“ Does Spraying Pay ? ”

This engraving is copied from the Annual Report of the New York Agricultural Experiment Station, located at Geneva, N. Y. We submit that the question “ Does Spraying Pay ? ” is fully answered.



Yield, \$6.55 per tree.

Yield, 45 cents per tree.

PETER COLLIER, *Director.*

ITHACA, N. Y., March 2, 1894.

Field Force Pump Co., Lockport, N. Y.:

MY DEAR SIRS—The copy of Weed's “Spraying Crops” received. Many thanks. It is the best thing to accompany a spray pump I know of; its authenticity, reliability, accuracy, compactness, etc., recommend it for the general use of every farmer. I have tried several Knapsack Sprayers, but I consider the Garfield the best. Yours sincerely,

M. V. SLINGERLAND.

TIONA, Pa., July 30, 1894.

Field Force Pump Co.—Please send me Book of Instructions, Catalogue and Price List of your pumps. I have used one of your force pumps for eight years, and can recommend them anywhere. Respectfully yours,

J. E. TEMPLETON, Tiona, Warren Co., Pa.

MEDINA, N. Y., Nov. 19, 1894.

GENTLEMEN—Have used one of your spraying outfits for over five years, and though in constant use every season, it has cost me nothing, absolutely nothing, for repairs.

Respectfully,

P. A. DAVIS.

WILKES-BARRE, Pa., July 30, 1894.

GENTLEMEN—I find the Garfield Knapsack Sprayer a most useful adjunct to our green house appliances. Respectfully,

GEO. E. FANCOURT, Rose Grower.

ENDORSEMENTS AND TESTIMONIALS.

Blight and rot in potatoes are prevented by spraying with Bordeaux mixture. The effect is very remarkable, even on potatoes not affected by rot when unsprayed. It makes a healthy vigorous foliage, retaining its vigor several weeks later than that on unsprayed potatoes, and this greatly increases the yield. In one case spraying with Bordeaux mixture increased a potato crop 322 bushels per acre, while unsprayed rows yielded only 102 bushels per acre.—*Prof. Wm. C. Sturgis of the Conn. Expt. Sta. American Cultivator, January 20th, 1894.*

HOW TO PREVENT PEARS CRACKING.

I have some Sheldon and Lawrance pear trees on which the fruit has cracked badly for the last 10 years. The Sheldon have been the worst, and some years I have been unable to pick any fruit at all. When about the size of walnuts they would crack in several places and then stop growing. I had made up my mind to graft them with something else, but was advised to spray with the Bordeaux mixture. This I did three times in the course of the summer. Two trees were sprayed in a row of ten. The result is that on the two trees there is not one cracked pear, while on the other eight trees the pears are all cracked. My experience with the Lawrence is the same. One tree was sprayed and has a few perfect pears and none cracked. One tree was not sprayed and has not a perfect pear. All are either cracked or covered with small dark spots or kind of rust. There seems to be no doubt that the Bordeaux mixture has helped them.—*Mrs. J. G. Clark, Washington County, R. I.*

GARLAND, N. Y., July 8, 1893.

GENTLEMEN—I borrowed of Mr. Cooley his "New Victor" horse power sprayer, and have just been over the vineyard the second time. I am convinced that I must have one this season if possible. I used it on my early potatoes also, and it is complete and does the work perfectly. Ship one at once to Adams Basin. Let me know if you can fill the order promptly.

Yours truly,

S. W. WADHAMS.

MONEY IN POTATOES.

There is more money in potatoes than in almost any other crop, provided they are properly managed. It has now been fully demonstrated that potato blight can be entirely prevented by properly spraying the vines with Bordeaux mixture through an effective spraying machine. The Potato Sprayer manufactured by the Field Force Pump Co., Lock-

port, N. Y., is one of the latest machines invented for this purpose, and has given perfect satisfaction wherever tried.—*American Agriculturist, December 3.*

SENACA LAKE GRAPE AND WINE CO., }
SEVERUE, N. Y., June 3, 1894. }

GENTLEMEN—We have used the New Victor Spraying Machine this season, and it works to perfection. I am much pleased with it. Have sprayed one hundred acres of vineyard, and am spraying trees to day.

Respectfully, GEORGE LUNNEY.

CAMDEN, Del., June 8, 1894.

The Fig. 57 "fills the bill" to the nicety. Nothing could be more satisfactory or more durable.

Yours, E. H. BANCROFT.

NEW ENGLAND HOMESTEAD, }
September, 14, 1894. }

Celery Rust may be prevented by spraying with carbonate of copper. Dr. Halstead of the New Jersey Experiment Station tried it last year after the blight was well established. He began about August 1 and sprayed regularly once a week. When the celery was dug the sprayed rows yielded 124 lbs. and the unsprayed row 72 lbs., or less than three-fifths as much.

BRIDGEHAMPTON, N. Y., Sept. 12, 1894.

Field Force Pump Company:

GENTLEMEN—I am highly pleased with the Double Empire Spraying Pump bought of you last spring. Myself and neighbors used it to apply both Bordeaux mixture and poison to potato vines. I have no hesitation in recommending the Empire Pump to any one.

H. G. HAND.

BATH, Stuben Co., N. Y., Dec. 7, 1894.

GENTLEMEN—The Two-Horse Victor Sprayer bought of you last spring worked to our entire satisfaction. We sprayed 90 acres of vineyard twice over without any breaks, and never out of repair, always working well. Can spray from ten to fifteen acres per day. We recommend this machine to all who need a sprayer.

Yours, EASTWOOD & BRUNSON,

Hermitage Vineyard.

HAMMONSPORT, Dec. 12, 1894.

GENTLEMEN—I have used one of your Victor Horse Power Machines for three years with perfect success, having less than one per cent. of rot, while vineyards near by have suffered severely from this disease. Too much cannot be said in favor of your machine. I can spray my fifty-acre vineyard in three days without rushing.

Respectfully,

L. D. MASSON.

Anti-Freezing Stock Well Pump.

FIG. 8.



*With Revolving Top, Gas Pipe Set-Length
and Polished Cylinder.*

The Cylinder or working part, is placed about three feet below the platform, and provided with a vent hole to discharge the water, which must otherwise remain in the pump when not in use, and which will effectually prevent freezing in cold weather—it being understood, of course, that the well is securely covered.

Is adapted to wells not exceeding thirty feet in depth, and may be used for wells of any depth by extending the set-length to within fifteen or twenty feet of the bottom.

The lever may be changed to any desired position by loosening the set-screw in the cap.

This Pump is very strong and will give the best satisfaction.

It has a close top, which effectually prevents dirt or leaves from getting into the Pump.

We fit these Pumps with bolt or screw cylinders, as desired.

No. 6.

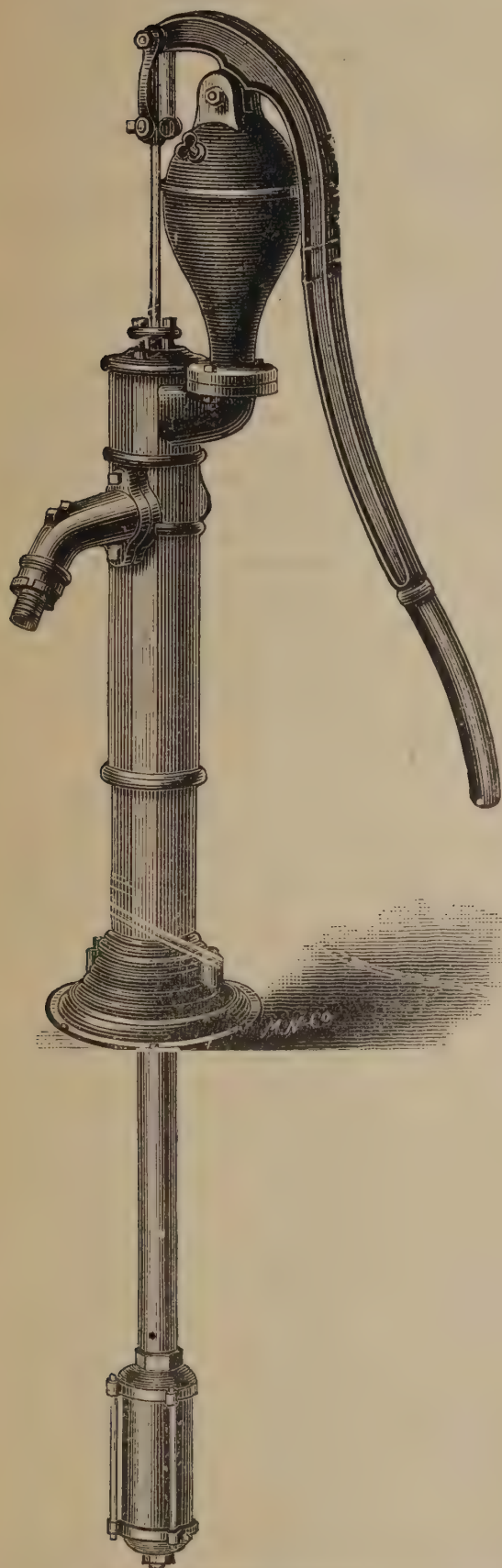
PRICE WITH BRACE, AND WITH 3 FEET SET-LENGTH.

With 3¼ in. Cylinder, 1¼ in. Pipe.....	\$12 00
“ 3½ in. “ 1½ in “	13 00
“ 4 in. “ 1½ in “	14 00

☛ If Brass Cylinders are wanted write for special prices.

WELL FORCE PUMP.

FIG. 4.



FIELD'S ANTI-FREEZING FORCE PUMP.

For Deep or Shallow Wells.

No. 18.—Simplest and best pump made. Weight, without set-length, 54 pounds. It is adapted to all the uses of a common pump, and, having a large air chamber, is capable of forcing water through hose two or three hundred feet. With three feet of hose and discharge pipe it will throw water 60 feet, thereby affording a splendid protection against fire. Every pump has a brass tube for attaching one-inch hose. When it is desired to place the cylinder more than 31-2 feet below the surface of the ground, send for special prices. By set-length we mean the connecting pipe and rod between the base of pump and cylinder, which is placed below freezing point. A vent hole, 3 feet below the surface, allows the water to run out of the pump, and effectually prevents freezing. When wells are more than 30 feet deep, the cylinder should always be placed within 20 feet of the bottom of the well.

This pump is adapted for wells any depth from 10 feet to 150 feet deep.

If you need a well pump write us for prices stating depth and diameter of your well.

SIZES AND PRICES.

With 3 or 3 $\frac{1}{4}$ in. cylinder, 3 $\frac{1}{2}$ ft. set-length, 1 $\frac{1}{4}$ in. pipe.....	\$14 00
With 3 $\frac{1}{2}$ in. cylinder, 3 $\frac{1}{2}$ ft. set length, 1 $\frac{1}{4}$ in. pipe.....	15 00
With 4 in. cylinder, 3 $\frac{1}{2}$ ft. set-length, 1 $\frac{1}{2}$ in. pipe.....	16 00

For brass cylinders to go with these Pumps, add \$4.00 to the above prices.

For windmill attachment for this pump add \$1.00 to list.

WHEN TO SPRAY, AND WHY.

APPLE TREES.

FOR the prevention of leaf blight spray as soon as the leaves are full grown with Bordeaux mixture or ammoniacal carbonate of copper. To destroy the aphids or plant lice, spray with kerosene emulsion as soon as the pests appear. To destroy the codling moth, canker worm and curculio, spray with Paris green or London purple, one-fourth pound in 40 or 50 gallons of water, soon after the blossoms fall, and again two weeks later. To destroy the web worm, spray with London purple or kerosene emulsion about August 1st to 10th, or as soon as they appear. This application should be made during the middle of the day, when the worms are out of their webs and feeding on the leaves.

CHERRIES.

Treatment same as recommended for the apple.

CURRANTS AND GOOSEBERRIES.

TO destroy the worms, spray with powdered white hellebore, one ounce in three gallons of water, as soon as the worms appear. To destroy the yellow aphids, spray with kerosene emulsion early in the season. To prevent mildew, use one-half ounce potassium sulphide to one gallon of water. The New York Experiment Station Report says:

* * * "Not only has every plant of gooseberry sprayed this season (1890) resisted the mildew, but plants kept as checks this season, that were sprayed last year, have shown but slight signs of this fungus. We have never been successful in preventing the mildew by one application of the sulphide, but have had to continue the treatment three or four times each season."

CABBAGE.

TO destroy the cabbage maggot, spray the roots with two ounces white hellebore in three gallons of water. Kerosene emulsion is also recommended; in either case the earth should be pushed back by hand and the liquid forced about the roots. To destroy the cabbage worm, spray with hot water at 130° Fahrenheit, or with kerosene emulsion. The green cabbage worm can be destroyed by spraying with pyrethrum, two tablespoonsful to two gallons of water.

COTTON.

THE Arkansas Industrial University at Fayetteville says the following is one of the most efficient, inexpensive and harmless remedies for the destruction of the cotton worm: 2½ lbs. pyrethrum and 1½ gallons kerosene oil, and 1 lb. soap; dissolve the latter in one gallon of boiling water, and

to this hot mixture add one gallon of the above extract (pyrethrum and kerosene), and mix thoroughly with a force pump; dilute with water 450 parts to one part of the emulsion and apply to the cotton with a "Vermorel" nozzle; this extract kills by contact, and, though destructive to insect life, is not in the least injurious to those handling it.

A very important feature of this extract as an insecticide is its cheapness. The cost of that used this season is as follows:

2½ pounds pyrethrum @ 30 cts. per lb.....	\$0.75
1½ gallons oil @ 15 cts. per gal.....	.22½
1½ gallons extract, cost.....	.97½
1 gallon extract, cost.....	.65
1 pound soap, cost.....	.10

In spraying, thirty gallons of the diluted emulsion is generally considered the amount necessary to cover an acre of cotton. This is made up at a strength of 1 part to 450 of water, therefore 75 cents will buy enough for 15 acres. It is a minimum price for an insecticide, and its cheapness, combined with its other good qualities, is bound to make it a very popular remedy for many insects.

The cotton worm can also be destroyed by spraying with 6 oz. London purple in 40 gallons of water. Apply soon as the worms appear; 45 gallons per acre will be sufficient.

CHINCH BUGS ON CORN

CAN be destroyed with the kerosene emulsion. Every farmer should learn to make this emulsion, as it is a most useful insecticide. It is especially valuable for killing lice on cattle and hogs. Paris green will not kill chinch bugs.

If the bugs are not yet in the corn, plow a deep furrow along the side of the field; they will enter, and throw into it stalks of green corn. When the bugs have accumulated on the corn, sprinkle with the emulsion. Put in fresh stalks and sprinkle whenever the bugs accumulate. If they break over the barrier, as they probably will, run a new furrow a few rows back in the corn and repeat. Where they have attacked stalks of standing corn, destroy by sprinkling.

If the remedy is tried, it should be used persistently. To kill one lot of bugs and then stop will do little or no good. When the bugs threaten to destroy as much as five or ten acres it will pay for one or two men to devote their whole time to the warfare. Only a part of each day, however, will be needed. Some corn will be lost at best, but the most of the field should be saved.

W. A. HENRY, Director.

Wisconsin Experiment Station.

The Garfield Knapsack Sprayer is especially recommended for this work.

PEACHES.

IF attacked by the black peach aphid, spray with kerosene emulsion. The plum curculio frequently attacks the peach, in which case spray with Paris green, two ounces to 50 gallons water; be sure to keep it well stirred, and use with caution. Never use London purple on peach trees.

STRAW- BERRIES.

LEAF blight can be prevented by use of the Bordeaux mixture, applied with a spray pump once in two weeks; first application must be made early in the season.

Destroy the crown borer by spraying with Paris green, 3 ounces to 40 gallons of water, as soon as the new leaves open, again just before the first blossoms unfold, and again after Aug. 1st.

TOBACCO.

THE tobacco worm, or horn caterpillar, is the chief pest of the tobacco field.

The moths appear in June and July, and the female at once lays eggs on the upper surface of the leaves; these hatch in about 24 hours, and the worms at once begin to eat. Can be destroyed by spraying with Paris green or London purple, $\frac{1}{4}$ pound to 50 gallons of water. Use the Vermorel Nozzle.

TOMATOES.

THE green tomato worm can be destroyed by spraying with London purple, $\frac{1}{4}$ pound to 60 gallons of water. This should not be

used after the tomatoes have begun to ripen.

GRAPES.

THE grape-vine flea beetle and the grape phylloxera can be destroyed by spraying with the kerosene emulsion. The former can also be destroyed with London purple or Paris green.

FUNGUS.

Treatment of Black Rot of the Grape.

Authority by B. T. GALLOWAY, A. J. COOK
and WM. D. BARNES.

TREATMENT.

Collect all the trimmings, old leaves and rotten berries and burn them. In the spring plow and prune early. Before vegetation starts, spray the vines thoroughly with the Bordeaux mixture, using the Vermorel Nozzle. About ten days after spray again with Bordeaux mixture, being particular to wet the foliage thoroughly. A third spraying should be made after the lapse of twelve or fifteen days, using the Bordeaux mixture. Spraying should be continued at intervals of twelve or fifteen days until the berries begin to color, but after the third application abandon the use of the Bordeaux mixture and substitute the ammoniacal solution of copper carbonate. It is believed that this will prove as effectual as the Bordeaux for later work, without danger of spotting the fruit.

BROWN ROT AND DOWNY MILDEW.

These diseases, which are caused by the same fungus, occur in sections where black rot prevails, and experience has shown that one treatment will answer for all. In the great grape-growing regions of Ohio and New York, where the downy mildew is the principal enemy, the ammoniacal copper carbonate solution will prove an effectual preventive. It must be thoroughly applied to all the green parts of the vine, being particular to make the first application before any signs of mildew have appeared. This treatment is strictly preventative, and it would be folly to wait until the enemy appears before beginning the fight.

ANTHRACNOSE

Or birds-eye rot, rarely occurs alone. As a rule, it is found with black rot or mildew. Treatment as recommended.

POTATOES.

SPRAY with Paris green, seven ounces to 50 gallons of water, to destroy potato bugs (Colorado beetle). Repeat as often as the beetles appear. Potato rot or blight can be prevented by spraying with Bordeaux mixture; first application when tops are about half grown, repeating every fifteen days until six treatments have been given.

HOP PLANT LOUSE.

THIS insect appears in June or early in July, and is very destructive. Spray as soon as the pests appear with kerosene emulsion. This is guaranteed to kill the lice in thirty minutes after application.

ORANGES.

TO destroy scale bugs, boil one pound of whale oil soap in one-half gallon of water in order to dissolve the soap, and then add water to make it one-half pound to the gallon. It kills all the young scale bugs, and most of the old ones. We throw a very fine spray in order to wet every leaf and branch, using as little water as possible. Use about two gallons of the preparation per tree.

TO PREVENT RUSTING OF ORANGES.

Place five or six pounds of good new lime and one pound of sulphur in a barrel and add water enough to slake. Then fill up the barrel and let it settle. Strain through a coarse gunny sack into another barrel, and apply with a spraying pump and nozzle.

PEARS.

THE pear slug can easily be destroyed by spraying with Paris green four ounces to 50 gallons of water, or kerosene emulsion as soon as it begins operations. Pear-leaf mite can be destroyed by spraying with kerosene emulsion. The codling moth and curculio should be treated same as recommended for apple trees.

PEAR SCAB.

This is a form of fungus growth. Treatment, spray early in April before the buds have started with a solution of sulphate of copper, one pound to eight or ten gallons of water, then again just before the blossoms appear, this time using the ammoniacal carbonate of copper solution. Two more sprayings at intervals of twelve or fifteen days may be necessary, if the disease is of long standing.

PLUMS.

DESTROY the aphids with kerosene emulsion and a fine spray nozzle. The curculio can be destroyed by spraying with 3 oz. Paris green to 40 gallons of water. First applications should be made as soon as blossoms have fallen, and repeat at intervals of a week or ten days. Four applications should be sufficient. Other enemies of the plum will be destroyed by this method, but in all cases be particular to keep the poison and water constantly stirred.

From experiments carried through two seasons we reach this conclusion: 1st.—That three-fourths of the cherries liable to injury by the plum curculio can be saved by spraying as above. 2d.—That enough of the plum crop can be saved by the same treatment to insure a good yield. 3d.—That there is no danger to health from its use. 4th.—That spraying is the cheapest and most practical method of preventing injuries by these insects.

A FEW POINTERS.

YOU ASK Why and when are brass working parts in the pumps better than iron. We answer, that brass working parts are not necessary when the insecticides, i. e. London purple, Paris green, whaleoil soap or the kerosene emulsion, only are to be used; but when the fungicides or ammoniacal mixtures, such as the Bordeaux mixture, copper carbonate, etc., etc., are to be used then brass is better, as it resists the action of the several acids more successfully than iron.

WE SUGGEST That when you desire to carry the spray to an unusual height, instead of trying to force it there, provide yourself with additional hose, or with our extension pipes, shown on page 9; these are made of a good quality of brass tubing, with couplings that will attach them to any of our outfits, and will be furnished to our patrons, with couplings, but without nozzles, @ 25 cts. per foot.

FORMULAS.

KEROSENE EMULSION.

In making the kerosene emulsion for spraying trees for lice, be sure and follow the correct method: Dissolve in 2 qts. of water 1 qt. of soft soap or $\frac{1}{4}$ lb. of hard soap by heating to the boiling point. Then add 1 pt. of kerosene oil and stir violently for from three to five minutes. This may be done by taking a common force pump and putting the end of the hose back into the mixture again. This mixes the oil permanently, so that it will never separate, and it may be diluted easily at pleasure. This mixture should be diluted to twice its bulk with water, or about 14 times as much water as kerosene. The kerosene emulsion is successful in destroying cattle lice and sheep ticks, as well as all varieties of plant lice.

FORMULA FOR BORDEAUX MIXTURE.

Six pounds of sulphate of copper are dissolved in six gallons of water; in another vessel four pounds of fresh lime are slaked in six gallons of water. After the latter solution has cooled, slowly turn it into the other solution and add 20 gallons of water. This, when all is thoroughly mixed and strained, is ready for use. In straining this mixture reject all of the lime sediment, using only the clear liquid; strain the white-wash through a coarse gunny sack, stretched over the head of a barrel.

SOLUTION OF AMMONIACAL CARBONATE OF COPPER.

Into a vessel having a capacity of about one gallon, pour one quart of ammonia (strength, 20° Baume); add three ounces of carbonate of copper; stir rapidly for a moment and the carbonate of copper will dissolve in the ammonia, forming a very clear liquid. For use dilute to 25 gallons.

EAU CELESTE, MODIFIED FORMULA.

Dissolve 4 pounds of copper sulphate in 10 or 12 gallons of water. Add 3 pints of strong ammonia, dilute to 50 gallons, and add 5 pounds of common washing soda. Stir thoroughly and the solution is ready for use. This may be used in place of the two mixtures mentioned above, but no special advantage is claimed for it over either of the others.

THE CORNELL UNIVERSITY,
COLLEGE OF AGRICULTURE.
ITHACA, N. Y., Sept. 11, 1891.

Sirs:—I recommend carbonate of copper for grape diseases instead of Bordeaux mixture, because it is much more easy to prepare and handle, and it is also cheaper. There are two or three good formulas. I usually dissolve 3 oz. of carbonate in a quart of ammonia and dilute to about 25 gallons. Another good

formula is 5 oz. of carbonate in 3 pts. of strongest ammonia, and dilute to 50 gallons.

Yours truly,

L. H. BAILEY,
Professor of Horticulture.

(From The Journal of Mycology, Washington, D. C. 1891.)

* * * The cheapest and most effectual remedy for black rot and downy mildew, taking everything into consideration, is the ammoniacal solution of copper carbonate. Next to this, a mixed treatment consisting of two or three early sprayings of Bordeaux mixture and the same number of late treatments with ammoniacal solution.

NO DANGER WHATEVER.

Not only hundreds, but thousands of tons of mineral poisons have been employed during the past decade by farmers throughout the country, whether to protect the potato crop, or the cotton crop, or other products of the soil from the ruinous attacks of insects. The general experience during this long period and over the whole country is so emphatically in favor of their use, and their perfect safety and harmlessness, with ordinary precautions, as to render almost laughable the objections of the few persons who object to them. No advancement, no improvement, no general benefit to the human race is ever accomplished without some attendant danger, and those who inveigh against such improvements as increasing the risks of life stand on the same footing as the opponents to arsenical poisons as insecticides.—Report of United States Entomological Commission.

(New York Weekly Tribune, Nov. 4, 1891.)

BY PROFESSOR A. J. COOK.

LIME WITH THE ARSENITES.

Use of the arsenites—London purple and Paris green—to protect apples is becoming very common. We should never use these poisons stronger than 1 lb. to 200 gallons of water; that strength is always sufficient to accomplish the purpose. If weaker than this, we do not always reap full benefit. Last year Professor Gillette found that by the use of lime with these substances the soluble arsenic was changed into an invaluable compound, and then the foliage was not injured. The same has been proved true at the Michigan station. We experimented on all our fruit trees, even the tender peach, and the lime in every case prevented all injury. We tried several applications at intervals of ten days on some plants, and no harm resulted. We see, then, that, by use of Bordeaux mixture or limewater, instead of pure water, we can entirely prevent injury to foliage by the arsenites. The limewater should be formed by putting from 1 lb. to 4 lb. of thoroughly slaked lime into 100 gals. of water. If we wish to use an insecticide and a fungicide at the same time, then we may add 1 lb. London purple to 100 gals. of Bordeaux mixture. In every case the lime must be carefully and thoroughly soaked, or that will kill the foliage.

Ohio Agricultural Experiment Station, Dec. 1892.

Spraying Apples.

The heavy and continued rainfall, during the spring and early summer of 1892, is thought, by many, to be the direct cause of the failure of the apple crop. No doubt this was true in many cases, as when heavy rains occur at the time of blooming the pollen may be washed away, and pollenization prevented. The bees, not being able to fly at such times, cannot visit the blossoms, which fact alone is sufficient to account for the crop failure, in a great measure.

The opinion has been held by a few that unfavorable weather is not, in all cases, the direct cause of failure, and some experiments carried on by the Ohio Experiment station strengthens the opinion. An orchard of Newton Pippins, of nearly two hundred trees, was divided off into plots, none of the plots containing less than one row, and some as many as four.

The dilute Bordeaux mixture, which was found to be best last year, occupied the same place this season. The ingredients used in this mixture are sulphate of copper, 4 pounds; lime, 4 pounds; water, 50 gallons. Comparing the two plots where this compound was used with the two unsprayed plots, the astonishing fact was observed that no marketable fruit could be found on the unsprayed plots, nor was there much fruit of any kind, while on the sprayed plots, which had been subjected to the same unfavorable climatic conditions, there was about half a crop.

The most reasonable explanation that can be offered is that spraying prevented the apple scab from attacking the young apples and blossoms. It is well known that scab attacks apples in all stages of growth, and if it appears very early it may cause the young fruit to drop prematurely. When it attacks the blossoms it, of course, destroys them. The first spraying was done before the trees had bloomed, and the supposition is that many of the fungus spores were thus destroyed and the apples given a chance to develop. This experiment also strengthens the theory that early spraying is essential to the best success in preventing apple scab.

The spores, from which the scab fungus develops, live over winter on the tree and begin growth in the spring at the same time as when the leaves start to grow. How rapidly the fungus develops depends on the weather. It follows then that the apples would be attacked earlier some seasons than others. It is true the fungus is prevented much easier than it is killed

after it is established, and to this end early applications and fungicides are far more effective than late.

No dates can be named for spraying, but a good plan is to make the first application just before the leaves open, and the second soon after the blossoms fall at which time four ounces of Paris Green should be added to every fifty gallons of the mixture, in order to kill the apple worm. A third spraying with the combined mixture, is to be given about ten days later, and still another after the same length of time, in case of continued wet weather.

How to avoid weighing the lime when preparing Bordeaux Mixture.

In mixing Bordeaux the trouble of weighing the lime may be obviated by use of the following simple test, and a tub of slacked lime can for convenience be kept on hand: Add milk of lime to the solution of copper sulphate and test it with two or three drops of potassium ferro-cyanide in solution. If enough lime has been added the potassium ferro-cyanide will not change color, but if not enough lime has been added the potassium ferro-cyanide will turn to a dark reddish-brown color. By adding gradually more lime and repeating the test with potassium ferro cyanide, it is easy to discover when there is enough lime in the mixture. Since an excess of lime does no harm there is no danger of adding too much. Bordeaux must be kept constantly agitated when spraying in order to prevent clogging the nozzle and to insure uniform strength of the application.

CHAS. MITZKY.

OTTAWA, ONT., Apr. 15, 1895.

I may say that I used last year your Victor Orchard Pump with satisfaction and have mentioned it in a bulletin now in press. The wheel-barrow style of Potato Sprayer which you were kind enough to send for trial has also proved very useful.

Yours truly,
JOHN CRAIG, Horticulturist,
Experimental Farm, Ottawa, Ont.

SPRAYING PUMPS,
NOZZLES
AND MACHINES.



FIELD
— FORCE PUMP
COMPANY.

—
LOCKPORT, N. Y.

U. S. A.